Endoscopic V/s External Approach DCR: A comparative Analysis

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ABSTRACT

Aims & Objective: *To compare the surgical procedures, intra-operative & post operative complications and overall success rate of Endoscopic Dacrocystorhinostomy (Endo-DCR) with External approach Dacrocystorhinostomy (DCR).*

Materials & Methods: *In this randomized, interventional, comparative study, 50 cases of mechanical Endonasal Dacrocystorhinostomy & 30 cases of conventional External Dacrocystorhinostomy were performed from January 2006 to April 2007 in the department of Ophthalmology in conjunction with department of Otorhinolaryngology, Sir Sunder Lal Hospital, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh. All patients underwent detailed general, medical and ocular history as well as thorough ocular and ENT examination to rule out any nasal pathology. Level of blockage was diagnosed by lacrimal syringing & probing, Jones dye test and dacrocystography.*

Surgery was done under local anesthesia except in children and uncooperative patients where general anesthesia was used. For Endo- DCR surgery, 0 & 30 degree rigid endoscope was used. In selected cases silastic sheet were used. The surgical outcomes and complications were analyzed.

Results: *Functional success and symptomatic relief were equivalent in both procedures. Endo-DCR surgery was found to be quicker to perform than external DCR surgery. The follow-up duration was comparable in both groups. Patient satisfaction was significantly higher in the Endo -DCR group.*

Conclusion: *Endo-DCR surgery offers a very attractive alternative to the well established technique of external DCR surgery for the treatment of primary acquired nasolacrimal duct obstruction with equivalent success rates, shorter surgical time and higher patient satisfaction.*

Keywords: *Chronic dacryocystitis, Endoscopic DCR, Epiphora, Endonasal DCR surgery, External DCR, Silicon intubation*

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INTRODUCTION

Dacryocystorhinostomy (DCR) is a surgical procedure to create an alternative lacrimal drainage pathway into the nasal cavity to restore permanent drainage for the previously acquired nasolacrimal duct obstruction (NLDO). The opening is normally made at the level of lacrimal bone. Classically it has been performed by using an external approach. It was first described by Addeo Toti in 1904[1] and modified by Dupuy Dutemps by the addition of suturing of the nasal and lacrimal mucosal flaps in order to form an epithelium-lined fistula.[2] The success rate of external approach is estimated to be between 85% - 90%.

The first intranasal Dacryocystorhinostomy was described in 1893 by Caldwell.[3] It was modified later by West and Halle (1914) using microscope for visualization. Later in 2002 Wormald PJ described Powered Endoscopic Dacryocystorhinostomy with full sac exposure and primary mucosal anastomosis.[4] The literature contains several figures of reported success rates ranging from 63% to 90%. The apparent advantages of endonasal DCR over external DCR are its less invasive nature, shorter operative time and preservation of pump function of the orbicularis oculi muscle due to the absence of an external skin and orbicularis incision. Despite the advantages, the general impression is that endonasal DCR has a lower success rate than external DCR.

The wide variability of success is likely to be due to surgical variability, patient demographics, and lack of standardized outcome measures in the medical literature. The aim of this study was to compare the result and advantage of both external DCR and endonasal DCR regarding patency rate, patient compliance intra operative and postoperative complication.

MATERIALS AND METHODS

The present study was conducted in Department of Ophthalmology in conjunction with Department of Otorhinolaryngology at Sir Sunderlal Hospital, IMS, BHU, Varanasi. The study was conducted in 16 months.

A prospective, randomized interventional comparative case series of 50 consecutive mechanical

endonasal DCR & 30 Conventional External DCR were included in the study. All patients were followed at 1 month, 3 month & 6 month interval. Patency was checked by sac syringing for external DCR and by both sac syringing and endoscopic inspection of the stroma for endonasal DCR. The outcome of External & Endoscopic DCR operation was categorized into complete cure, partial cure or no improvement according to the degree of symptomatic relief following operation.

All cases had primary acquired nasolacrimal duct obstruction. A diagnosis was made from ophthalmic examination and/or radiological findings. Documented obstruction on syringing and probing, Jones dye test, and dacrocystography were used in the diagnosis. Patients underwent intranasal examination to rule out intranasal pathology.

The external DCR surgery was performed by the standard technique. The mechanical endoscopic endonasal approach used 0 & 30 degree Rigid Endonasal Endoscope(Figure 1) and included enlargement of the bony ostium & full length opening of the lacrimal sac and approximation of nasal and lacrimal sac mucosal edges (Figure 2-10). No sutures were used. Sialistic sheet was inserted in selected number of cases. The cases were performed under both general and local anesthesia depending upon situation and patient profile.

Immediate postoperatively, patients were asked to put antibiotic steroid eye drop. Nasal suction & sac syringing was done, once a week, for 1 month. Endoscopy was done after 1 month, to check patency of the stoma and to remove any crust and granulation if present.

OBSERVATIONS AND RESULTS

In this study, from January 2006 to April 2007, total 80 eyes of 72 patients were enrolled for the procedure as 8 had bilateral disease. Of these 72 cases, 20 were male and the rest of 52 were females (Fig. 1). 50 cases underwent Endoscopic DCR and rest 30 cases underwent External DCR. Out of 50 Endoscopic DCR, 25 underwent conventional Endoscopic surgery, 13 underwent powered Endoscopic surgery and 12 underwent Endoscopic DCR along with sialistic sheet. The minimum age of registration for Endoscopic procedure was 14 years & maximum age was 56 years with mean of 33.6 years while minimum age of registration for External DCR was 28 years & maximum age was 75 years with a mean of 46.0 years.

There were 74 (92.5%) fresh cases as compared to 6 (7.5%) failed DCR cases. Among the total of 74 cases 49 cases presented with infection as the main etiology, while rest of 25 cases were idiopathic in nature. Out of the 6 failed cases 3 had previous history of External DCR surgery without stent (Table 1).

Table 1: Showing Aetiology of Lacrimal Sac / NLD Obstruction

S. No.	Aetiology	No. of patients	Percentage
1	Idiopathic	25	50.00
2	Infection	49	61.20
3	Trauma	0	0
4	Previous surgery (failed DCR)	6	7.5

51 patients (63.75%) out of 72 patients presented with symptoms of lacrimation. 14(28.00%) had mucocele at the time of presentation along with epiphora. 5(10.00%) patients were diagnosed with acute dacryocystitis preoperatively on the basis of symptoms. They were treated medically before operation. In 8, patient's fistula with mucopurulent discharge was noted in lacrimal sac region. 10 patients presented with dry eye syndrome. (Table 2)

Table 2: Various indication for DCR

S. No.	Symptoms	No. of patients	Percentage
1	Epiphora	51	63.75
2	Mucopurulent discharge	09	18.00
3	Painless swelling over lacrimal region	14	28.00
4	Painful swelling over lacrimal region	5	10.00
5	Itching	2	4.00
6	Burning sensation	3	6.00
7	Sticky eye	1	2.00
8	Rhinitis	7	14.00

The level of obstruction was compared in 2 groups. Lacrimal sac/ nasolacrimal duct was the most common site of obstruction noted in 41 eyes (82%) of endoscopic DCR group and 23 (76%) of External DCR group, as compared to canalicular obstruction which was detected in 18% & 24% of cases in both group, respectively[Table 3].

Table- 3 Showing level of Obstruction in CDC

S.No	Level of obstruction	Endoscopic DCR		External DCR	
		No	%	No	%
1.	Canalicular obstruction	09	18 .00	7	23.33
2.	Lacrimal sac/duct obstruction	41	82.00	23	76.60
Total		50	`100.00	30	100.00

The mean duration of symptoms in Endoscopic group was 1.5±0.698 yrs and in External DCR group was 1.46±0.74. The average duration of Endoscopic DCR surgery was 49 and for External DCR it was 119.6mm ($p<0.001$) which was statistically significant.

Complications included excessive intra operative bleeding in External and Endoscopic DCR surgery which was 10 % and 5 % respectively. Four patients had lacrimal sac flap loss during separation of lacrimal sac from lacrimal fossa while loss of nasal mucosa during bone cutting was observed in 2 patients in External DCR. There was no such complication noted in Endoscopic DCR surgery (Table 4)

Table 4: Showing intra operative complications during surgery

S. No.	Intra operative Complication	Endoscopic DCR		External DCR	
		No	%	No	%
1	Excessive bleeding	5	10	10	33
2	Lacrimal sac flap loss	0	0	4	13.30
3	Loss of nasal mucosa during bone removal	0	0	2	6.67
4	Orbital injury	0	0	0	0
5	CSF rhinorrhea	0	0	0	0

The average follow up period was 5.9 months. 45 (90%) cases demonstrated primary surgical success in 1st month of follow up in Endoscopic group as compared to 29 (96.67%) cases in External group while 1 case of this group presented with functional block. In Endoscopic group, out of 5 (10%) cases, 2 presented with functional block while rest 3 cases had anatomical obstruction of neoostium. At 3 months interval, patency of lacrimal passage was maintained in External DCR group but in Endoscopic group patency was increased after revision surgery. At 6 months interval, successful surgical outcome was observed in 46 of 50 cases in Endoscopic DCR group as compared to external DCR group where 28(93.33%) remained patent. These findings were not statistically significant.

Figure 1: 0^0 Rigid Endoscope with light source

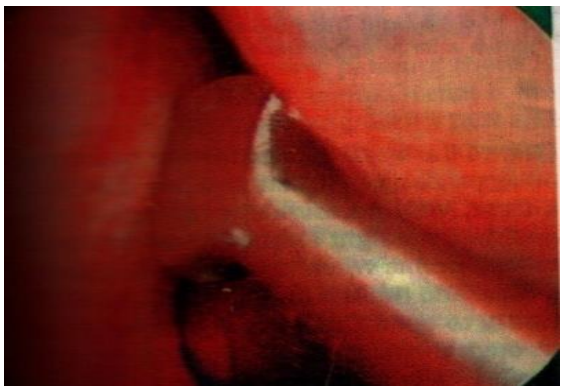


Fig. 2: Endoscopic view –incising the mucosa over the anterior lacrimal crest

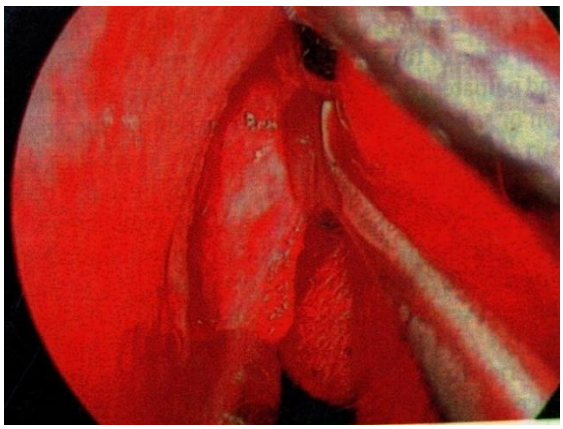


Fig. 3: A nasal mucosal flap is being elevated after a reverse ‘ C” shaped incision on mucosa of the lateral nasal wall

Figure 4. Incising the lacrimal sac with a Sickel knife

Fig. 5: Mucopus being released from an infected lacrimal sac

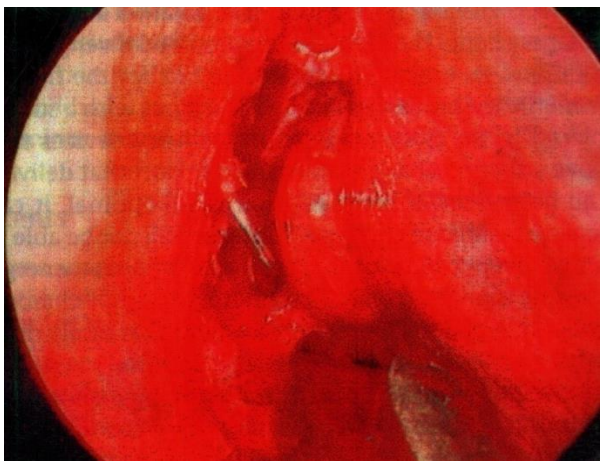
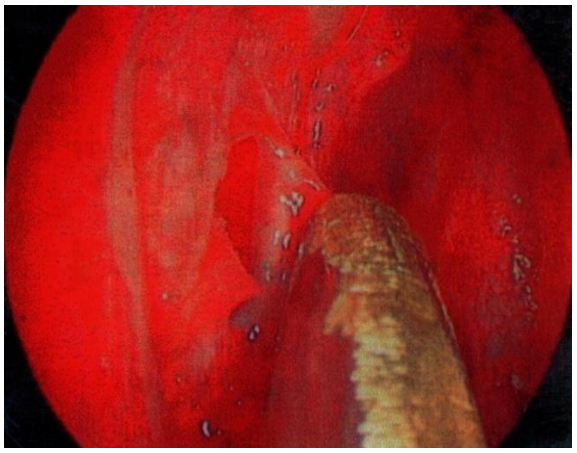


Fig. 6: Lacrimal probe is placed within the sac



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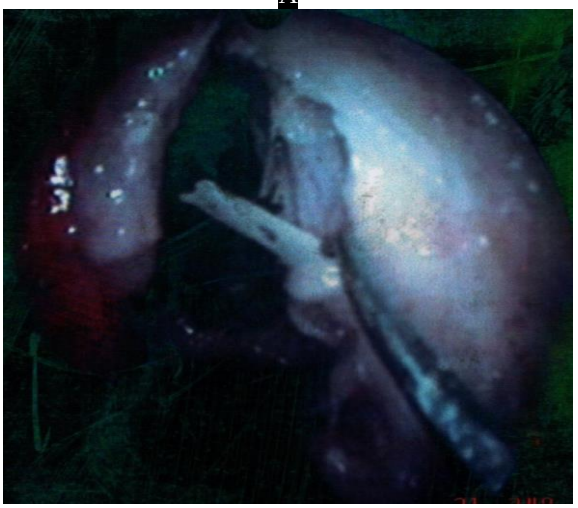

Figure 7(a). Suction reveals the opening in the sac. (b) breaking of lamina papperacea

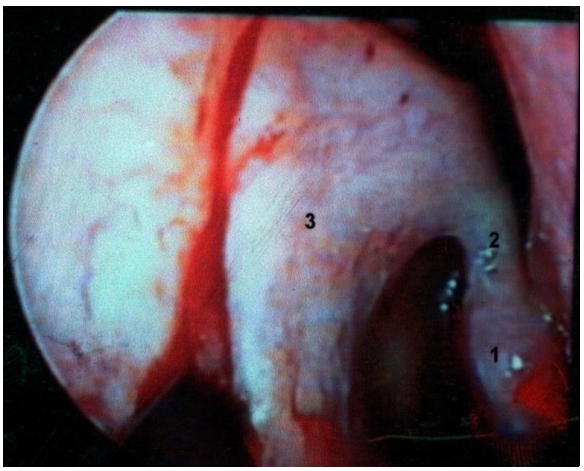

Figure 9 . Mucosal incision 8 to 10 mm above and anterior to the axilla of the middle turbinate 1=middl e turbinate 2=axilla of middle turbinate 3=lateral nasal wall

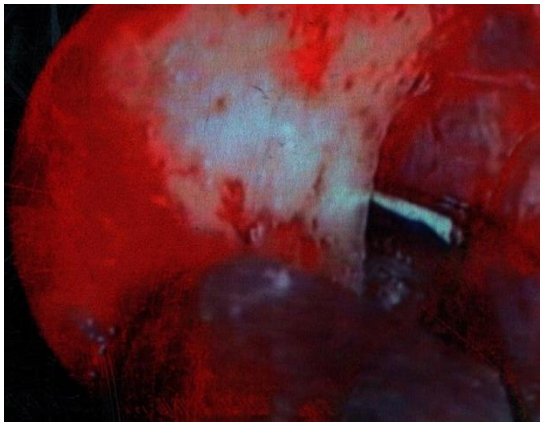

Figure 10. removal of the bone of the frontal process of the maxilla by Kerrison bone punch

DISCUSSION

External DCR surgery was regarded as the gold standard treatment for treating nasolacrimal duct operation at the turn of the century. Endonasal DCR had gained increasing popularity and acceptance in the last decade for the treatment of primary nasolacrimal duct obstruction (NLDO). A strong driving force for this decision in general is patient's preference to avoid a facial scar as well as lesser complication rate as compared to external DCR surgery.

Various studies have compared Endonasal DCR technique to the traditional external DCR technique. In present study, overall success rates of Endo-DCR (46 cases) and external DCR (28 cases) surgeries had statistically significant success rates (92% versus 93.67%) at a mean follow-up period of 5.9 months. This difference was not statistically significant. Cokkeser et al[5]. Also found comparable success rates between external and Endo- DCR (90% versus 88%). Dolman et al[6]. In a study looking at external DCR and non-laser endonasal DCR, found both procedures to have equivalent success rates (90% versus 89%). His group also found that nasal approach was more rapid and more acceptable to patients who had an alternative technique used on the other side as seen in present study.

The success rates in both groups were found to be equivalent while patient satisfaction was noted to be slightly higher with endonasal DCR surgery. Which may be due to the shorter surgery time; lack of external incision; quicker return to work and lesser follow-up appointments (no suture removal)? Surgical technique is significant contributor to achieving a high success rate in DCR surgery.

Both surgical procedures have minimal rate of hemorrhage, but there is a low to nil risk of cerebrospinal fluid rhinorrhea in endoscopic endonasal surgery. Dacryocystitis is not a direct contraindication to the endoscopic surgery, and patients with chronic dacryocystitis can be treated with the endoscopic technique.

Complications of endoscopic endonasal DCR are low but can include re-stenosis of the opening, bleeding from the nasal cavity, orbital injury or canaliculi erosion. Tsirbas and Wormald[7] used a similar technique in endoscopic DCR to fully expose the lacrimal sac and marsupialize it into the lateral nasal wall with the nasal and lacrimal mucosa in opposition. They achieved high long-term success rates with this approach at 89%. Although Endo-DCR has high success rate but chances of failure may be because of certain factors like anatomical variation in nasal cavity, cicatricial closure of the ostium[8-10], adhesion between the osteum and the middle turbinate[11] and granuloma formation within the ostium[8].

Serious complications including orbital and subcutaneous emphysema, retrobulbar hemorrhage, medial rectus paresis, and orbital fat herniation are rare in the medical literature for both forms of DCR surgery.[12-14] We found no serious complications in our study.

Surgical success was defined as both anatomical patency and symptom relief in our study, giving more conservative results. Anatomical patency and symptom control have varying results in both external and endoscopic surgery throughout the medical literature. Symptom relief of flow-related symptoms is not achievable in every patient, especially if there is hydraulic resistance of the canaliculi and nasolacrimal duct.

It is difficult to compare success rate for primary surgery between external DCR and the endoscopic endonasal procedures as there are few comparative studies. Few studies have standard outcome measures, with some studies defining success as patency to irrigation with others concentrating on symptom resolution. Our study included both objective patency results and subjective patient symptom measurements. Evidence for endoscopic dacryocystorhinostomy appears to be comparable to the "gold standard" external approach, with success rates ranging from 78% to 97%.[15]

CONCLUSION

Wide marsupailisation of whole lacrimal sac into the nose by intranasal endoscopic DCR, is a simple, minimally invasive, day care procedure and had comparable result with conventional external DCR and is now considered safe alternative when it comes to treating nasolacrimal duct obstruction. Endoscopic DCR may be indicated on a primary basis or as revision surgery following failed external DCR. Complication rate was lower in endoscopic DCR than those associated with external DCR.

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